

Application No. 09/825,107
Amendment Dated November 3, 2003
Reply to Office Action of June 06, 2003
Express Mail No. EV067241255USUS

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

What is claimed:

1-2 (canceled)

1. (currently amended) An input device adapted for use by a seated user for receiving an x-y input and input from at least one input actuator on the input device; the input device comprising:

- B. Scott
- a) a housing adapted for use independent of any solid surface beyond the user's hand;
 - b) the housing comprising a main body section with a long axis substantially parallel to a line in the body of a user grasping the pointing device running through the forearm of the user to the tip of the user's extended thumb;
 - c) the housing further comprising a platform for containment of an x-y input device, the platform placed to be protruding outward from and substantially perpendicular to and slightly skewed to one side of the long axis of the main body section;
 - d) the housing having a channel for placement of the user's index finger;
 - e) the housing having a channel for placement of the user's middle finger;
 - f) the channels positioned to place the user's index and middle fingers below and substantially orthogonal to the orientation of the user's thumb while the user is grasping the device;
 - g) an input actuator being integrally formed into a recessed portion of at least one of the channels; and
 - h) an x-y input sensor placed at the end of the input device, distal to the user's wrist, such that the x-y input is provided to the x-y input sensor by movements of the thumb primarily comprised of circumduction of the thumb's basal joint.

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2.4. (original) The input device of claim 1 wherein the x-y input is provided by the thumb tip of the user.

5. (canceled)

7. (previously presented) The input device of claim 1 wherein at least one of the input actuators comprises a zero force touch switch to receive mouse-button inputs.

8. (original) The input device of claim 1 wherein the zero force touch switch detects contact of the user's finger.

9. (original) The input device of claim 1 wherein the zero force touch switch detects the interruption of a beam of light.

10. (currently amended) The input device of ~~claim 8~~ claim 3 wherein the input actuator integrally formed in the recessed portion of the at least one channel further comprises:

the a beam of light that travels between an emitter and a detector and further comprising an adjustment means for adjusting the placement of the emitter and detector pair along a path substantially perpendicular with the finger channel to allow adjustment of the activation position of the zero force touch switch input actuator to accommodate variations in finger length.

12. (currently amended) The input device of ~~claim 9~~ claim 3 wherein the placement of the a beam of light for a zero force touch switch an input actuator actuated by the user's index finger and the placement of ~~the a beam of light for a zero force touch switch~~ an input actuator actuated by the user's middle finger are both adjusted by a common adjustment means for adjusting the placement of the beams of light.

10. (currently amended) The input device of ~~claim 8~~ claim 3 wherein the placement of the beam of light can be adjusted to accommodate a range of finger lengths via input to an adjustment screw.

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³12. (previously presented) The input device of claim ² wherein the x-y input from the user's thumb tip is provided to a touchpad.

⁴13. (previously presented) The input device of claim ³ wherein the touchpad may be tilted through use of at least one tilt adjustment screw.

¹³14. (original) The input device of claim ¹ wherein the x-y input from the user's thumb is provided to a track ball.

⁵15. (previously presented) The input device of claim ² wherein the device senses the thumb tip at a perimeter input position and communicates to software the user's request for x-y movement of the object image under software control until the user's thumb tip ceases to be detected at the perimeter position.

⁶16. (previously presented) The input device of claim ² wherein the x-y input from the user's thumb tip is provided to a touchpad and a set of perimeter input position commands are actuated by pressing tactile cursor movement buttons adjacent to the touchpad.

17. (canceled)

¹⁶18. (currently amended) The input device of claim ¹⁵ ~~claim 17~~ claim 29 further comprising:

a) a scroll-mode select touch switch positioned to be actuated by a movement of the thumb; and

b) ~~a finger touch switch positioned at the bottom of a channel intended to receive and support the index finger of the user such that the movement of the index finger tip of a supported channeled index finger actuates the touch switch; and~~

c) ~~control circuitry logic~~ control logic to interpret the input from the scroll-mode select touch switch and the ~~finger touch switch in the index finger channel~~ first input actuator wherein the ~~circuitry~~ control logic interprets the activation of the ~~finger touch switch~~ first input actuator after the onset

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of a maintained activation of the scroll-mode select touch switch as a request for continued scrolling of a displayed image on the computer's image display for as long as both the scroll-mode select touch switch and the ~~finger touch switch~~ first input actuator are activated.

¹⁸
~~19.~~ (currently amended) The input device of ~~claim 17~~ ¹⁵ ~~claim 29~~ further comprising:

- a) a scroll-mode select touch switch positioned to be actuated by a movement of the thumb to toggle the operation of the x-y input sensor from a first mode to a second mode; and
- b) ~~a finger touch switch positioned at the bottom of a channel intended to receive and support the index finger of the user such that the movement of the index finger tip of a supported channeled index finger actuates the finger touch switch; and~~
- c) control circuitry logic to interpret the input from the scroll-mode select touch switch and the ~~finger touch switch in the index finger channel~~ first input actuator wherein the circuitry control logic interprets the ~~activation of the finger touch switch after the scroll-mode select touch switch has been used~~ input to the scroll-mode touch switch as a request to toggle the operation of the x-y input sensor control logic from a first mode to a second mode and while operating in the second mode, the control logic interprets input to the first input actuator as a request for continued scrolling of a displayed image on the computer's image display for as long as the ~~finger touch switch~~ first input actuator ~~is remains~~ activated.

¹⁴
~~20.~~ (currently amended) ~~An~~ ¹ The input device of claim 3 with wherein the input actuator being integrally formed into a recessed portion of at least one of the channels is a zero force touch switch comprising a conductive capacitive sensing plate located in the bottom of a channel contoured to receive a user's finger.

¹
 21-23 (canceled)

¹¹
~~24.~~ (currently amended) The input device of claim ~~18~~ ¹⁶ wherein the ~~finger touch switch~~ first input actuator is a zero force touch switch.

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19 (currently amended) The input device of claim 18 wherein the ~~finger touch switch~~ first input actuator is a zero force touch switch.

21 (currently amended) An input device for receiving input from at least one input actuator on the input device; the input device comprising:

- a) a housing having a channel adapted to receive placement of a user's finger;
- b) an input actuator being integrally formed into a recessed portion of the channel, wherein the input actuator detects the interruption of a beam of light between an emitter and a detector; and
- c) an adjustment means for adjusting the placement of the emitter and detector pair along a path substantially perpendicular with the finger channel to allow adjustment of the activation position of the input actuator to accommodate variations in finger length.

22 (currently amended) The input device of claim 21 wherein the channel is adapted to receive the user's index finger and further comprising:

- d) a second channel in the housing adapted to receive the user's middle finger; and
- e) a second input actuator being integrally formed into a recessed portion of the second channel, wherein the second input actuator detects the interruption of a second beam of light between a second emitter and a second detector;

wherein the adjustment means for adjusting the placement of the emitter and detector pair along a path substantially perpendicular with the finger channel to allow adjustment of the activation position of the input actuator to accommodate variations in index finger length also adjusts the placement of the second emitter and the second detector along a path substantially perpendicular with the second finger channel to allow adjustment of the activation position of the second input actuator to accommodate variations in middle finger length.

23 (previously presented) The input device of claim 22 wherein the placement of the beam of light can be adjusted to accommodate a range of finger lengths via input to an adjustment screw.

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15. (new) An input device adapted for receiving an x-y input and input from at least one input actuator on the input device; the input device comprising:

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- a) a housing adapted for use independent of any solid surface beyond the user's hand;
 - b) the housing comprising a main body section with a long axis substantially parallel to a line in the body of a user grasping the pointing device running through the forearm of the user to the tip of the user's extended thumb;
 - c) the housing further comprising a platform for containment of an x-y input device, the platform placed to be protruding outward from and substantially perpendicular to and slightly skewed to one side of the long axis of the main body section;
 - d) the housing having a first input actuator for engagement with the user's index finger;
 - e) the housing having a second input actuator for engagement with the user's middle finger;
 - f) the first and second input actuators positioned on a housing face in positions adapted to place the user's index and middle fingers substantially orthogonal to the orientation of the user's thumb while the user is grasping the device with both the index and middle fingers positioned to allow input from the fingers to the first and second input actuators, and placing the tips of the user's index and middle fingers on the other side of the device from the user's thumb; and
 - g) an x-y input sensor placed at the end of the input device, distal to the user's wrist, such that the x-y input is provided to the x-y input sensor by movements of the thumb.

20. (new) An input device for receiving an x-y input from a user's thumb, comprising:
a housing having an upper surface shaped for supporting a user's thumb thereon in a position substantially coextensive with a user's forearm corresponding to the user's thumb;
a fin extending upward from said housing along a direction substantially parallel to the forearm of a user holding the input device in a manner for being used, said fin located for supporting a user's thumb at the region at which it connects to the hand;
at least one input actuator for receiving x-y input, the input actuator extending substantially perpendicularly upward from said housing at a location allowing a user's thumb to

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contact and to move in contact along the input actuator's surface without undesirable flexural motion of the thumb at the thumb's interphalangeal joint; and

said housing having at least one other surface located substantially opposite to said upper surface for allowing at least a portion of at least one user's finger from the same hand as the thumb to be in contact therewith for allowing a user to operatively hold and support the device.

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31. (new) An input device for receiving an x-y input from a user's thumb, comprising:

a housing having an upper surface shaped for supporting a user's thumb thereon in a position substantially coextensive with a user's forearm corresponding to the user's thumb;

at least one input actuator for receiving x-y input, the input actuator extending substantially perpendicularly upward from said housing at a location allowing a user's thumb to contact and to move in contact along the input actuator's surface without undesirable flexural motion of the thumb at the thumb's interphalangeal joint; and

said housing having at least one other surface located substantially opposite to said upper surface for allowing at least a portion of at least one user's finger from the same hand as the thumb to be in contact therewith for allowing a user to operatively hold and support the device.

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32. (new) The input device of claim 31 further comprising a scroll-mode select switch placed in sufficient proximity to the at least one input actuator extending substantially perpendicularly upward from the housing so that a user can provide input to the input actuator with the user's thumb and then provide input to the scroll-mode select switch with the same thumb without requiring movement of the portion of the at least one user's finger in contact with the housing to operatively hold and support the device.

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33. (new) The input device of claim 31 wherein a scroll-mode select switch is located near the base of the input actuator and positioned for engagement by the thumb while moving from the position substantially coextensive with the user's forearm to a position further to the left for a thumb on a right hand using a right handed device and further to the right for a thumb on a left hand using a left handed device.

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34. (new) The input device of claim 32 further comprising a finger touch switch positioned at the bottom of a channel intended to receive and support the index finger from the same hand as the thumb of the user such that the movement of the index finger tip of a supported channeled index finger actuates the finger touch switch and a prescribed input to the scroll-mode select switch causes input to the finger touch switch to be interpreted as a request to scroll a document.

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